

EDITORIAL ARTICLES.

DELBET ON DRAINAGE OF THE PERITONEAL CAVITY.

Dr. Pierre Delbet, in the *Annales de gyn. et d'obstet.* Feb., 1890, calls attention to the changes of opinion in regard to the subject of drainage of the peritoneal cavity, in the past twenty years. Gynecologists noticed after laparotomies that the cul-de-sac of Douglas sometimes became the seat of a collection of fluid, and the idea naturally suggested itself of using drainage, where such collections were feared, to prevent their formation. Peaslee advised such a procedure. In 1867 Koeberlé described the glass tube which bears his name, and which was adopted with slight modifications by Spencer Wells, Atlee and others. Marion Sims, noticing that almost all the deaths were due to septicæmia, and that an altered exudate was found in the peritoneal cavity, advised drainage through the cul-de-sac by the vagina in all cases of laparotomy. He made a great many proselytes among the German surgeons, Nussbaum and Olshausen being of the number. A better knowledge of antiseptic principles demonstrated that exudations were not dangerous while they remained aseptic, and also demonstrated the danger of admitting septic matter by the vagina. Bardeenheuer championed preventive drainage in all cases, but his arguments were ably refuted by A. Martin.

The question of drainage only comes up to-day in a special class of cases, and in regard to its utility the author made the following experiments:

Cadavre opened as in a laparotomy and abdomen filled with water. A drainage tube placed in lower angle of wound, taking care that its extremity did not touch the walls of the pelvis. Glass and rubber tubes used successively with and without lateral orifices. The tube in place, the abdominal wall was closed about the tube, and pressure was

made on the abdomen in order to bring about a condition resembling normal abdominal pressure. Very little fluid escaped and none by the tube. If the tube was moved about and raised up and down quickly a jet of fluid escaped and rose to a slight height, but it stopped abruptly as it began. The failure to drain seemed to be due to the stopping of the tube's openings by the loops of intestines. In order to determine if this phenomena was present in the living, the experiment was repeated on dogs. In these animals the muscular layer in the intestine attains a much greater development than in man, and when it contracts the canal is almost as hard as wood, so that there would be much less chance of its obstructing the tube than is the case in man. The same condition was observed in dogs as in the human subject.

If the same thing happened in the living subject after laparotomies, the author was at a loss to account for the reddish serous flow that is so often observed. In order to solve this problem the following experiments were made:

A glass tube was placed in the cul-de-sac of a small living dog June 3, 1889. Two days later 50 grams of an aseptic saline solution were introduced into the abdominal cavity. Nothing returned by the tube. Fifty grams more injected. Nothing returned at first, but the animal made an abrupt movement and the liquid escaped by the tube. From this time at each new injection the liquid escaped from the tube. The animal was killed and tube found to be surrounded by false membranes through which there was a slight fissure. It was naturally assumed that the tube had been completely shut off from the peritoneal cavity, thus preventing the return of the fluid until the animal had, in making the abrupt movement, enabled the adhesions to become separated. Forty-eight hours after a rubber tube was placed in the peritoneal cavity of another dog; 150 grams of liquid was injected through a canula; nothing returned by the tube. An immediate autopsy showed the tube completely surrounded by epiploon but there were no false membranes.

On June 5, a glass and a rubber tube were introduced into the abdomen of a large dog. Fifty grams of a salt solution were injected by the rubber tube, but nothing returned. Upon injecting fifty more

grams the fluid returned by the glass tube, but not by the rubber one, although force had been used with that injection. A hundred grams were then injected by the glass tube, and the liquid returned through the glass tube, but nothing was seen to pass the rubber tube. Two days later an injection was made through the rubber tube; the liquid immediately returned, but only by the glass tube. During the night a yellowish, serous fluid passed in considerable quantity through the glass tube. The animal was killed the next day, and the autopsy showed that the two tubes were completely isolated from the peritoneal cavity. They were in a cavity formed by the adhesions of loops of intestines.

The spontaneous discharge, which was abundant, did not come from the peritoneal cavity, but was from the exudations from the false membranes constituting the accidental cavity.

A glass and a rubber tube were placed in the peritoneal cavity of a dog, June 6. The following day 100 grams of salt solution were injected by the rubber tube; nothing returned. On the 8th the animal was killed. The tubes were enveloped by epiploon. No adhesions. Eight experiments were made with rubber and glass tubes and iodoform gauze to determine how long before the tubes were shut in by adhesions. It is unnecessary to go into details, but it is sufficient to say that all antiseptic precautions were taken, and the peritoneum was in all cases healthy. It was determined that at the end of forty-eight hours the sequestration was almost completed if the epiploon did not shut in the tubes. Moreover, it sometimes happens that the tubes are partially or completely closed by fibrinous coagulations. The following conclusions are drawn from the above experiments:

The ability of the tubes to drain depend upon several things. Coils of intestine may come in contact with the openings and prevent drainage. The tubes may be obliterated by coagulated fibrin (capillary drains are not open to these objections). Adhesions are rapidly produced even about aseptic drains, and shut them off from the peritoneal cavity.

Cases complicated by ascites are not considered in this connection.

The deductions drawn from the experiments mentioned are not en-

tirely theoretical in their scope, as both Polk and Hunter have cited cases where the lateral openings of the tubes were occluded by omentum.

The author asks if these experiments should carry the conclusion that drainage of the peritoneum was of no avail. He thinks not, but suggests that the good effects may be due to the rapid development of adhesions which isolate suspected points and make the danger extra-peritoneal. But these adhesions, which are perhaps the reason for its efficiency, may prove themselves dangerous.

Objections to Drainage.—That it retards the cure, which can not be said of cases where the tube is not left longer than 24 hours, and where a temporary suture is placed, at the time of the operation, to be tightened later.

That drainage favors septic infection, or does not guarantee the evacuation of serous fluid, even when an aspirating force is used.

That the tubes can wound and even perforate the viscera. The lower part of the rectum, being fixed, may suffer from these mishaps.

That the tube favors the later development of hernia. This danger is greater when very large tubes are used.

That the drain may cause peritonitis. If this objection is restricted to the local adhesive inflammation it is just, but that it can give rise to it, except as a means of admitting fresh infection, is doubtful, and the author does not remember ever to have seen it occur in animals.

That drainage is a factor in causing adhesions.

The author states that a drain left in the abdomen of animals 48 hours, particularly of dogs, is almost always surrounded by adhesions. This is so in cases where it is observed in autopsy or secondary laparotomy, but in these cases the regular evolution of events is interfered with. Coe's case where a tube was removed soon after an operation and a canal was found so perfect as to hold water which was poured in it is one of the best proofs offered for the above statement. These adhesions may bring with them persistent pain, intestinal obstruction, although we do not know whether they increase or diminish, persist or disappear. Munde reports a case where the tube seemed to act as an exciter of reflex vomiting.

The methods of drainage are classified according to the road of drainage and the material used.

Vaginal drainage has been recommended in the past, but is now rarely used except after operations by the vagina, either hysterectomy, or the removal of the tubes or ovaries. The advantage of the cul-de-sac being the the most dependent point is offset by the fact that fluid in front of the broad ligament may not be influenced. It is necessary to exercise great care to avoid infection by the vagina. A. Martin sometimes employs vaginal drainage after operations where there is a large amount of tissue that must break down. He encloses the suspicious territory it by sutures to a drainage tube which communicates with the vagina, so that the material is shut off from from the peritoneal cavity.

Abdominal Drainage.—While there are many kinds of drains employed they may all be divided in two classes. One class includes the simple tubes through which the liquids are forced simply by abdominal pressure. The other class utilizes a special force, capillary attraction.

Drainage by Simple Tubes.—They are made of glass, hard and soft rubber and metal. They differ in length and in diameter. Some have lateral perforations and some, as that of Sims', have a double current. The author agrees with Mikulicz and Loebker, who object to the tubes because they do not insure evacuation of fluids. During the first hours after an operation if the intra-abdominal pressure is feeble, as one often finds it, the patients immobilize their diaphragm and breath after the superior costal type and there is no reason for fluids to flow out through the tube against gravity. If the intra-abdominal pressure is notably superior to atmospheric pressure, the coils of intestine press about the tube and obliterate partially, or completely, its orifices. In fact, during the first hours the tubes work badly, or not at all, and at the end of 48 hours they are surrounded by adhesions, or often obstructed by fibrinous coagulations. Gynæcologists, having for sometime noticed the inefficiency of the tubes to drain where the only force was abdominal pressure have sought to increase the value of this force by diminishing pressure on the outside by means of the syphon or by the syringe. The objections to the former are that it is difficult to preserve rigid antisepsis, and it easily becomes disarranged. Aspiration made

by means of the syringe and a rubber tube has been employed by some surgeons every three hours. To test the utility of this means the following experiment was made: A litre of water was injected into the abdominal cavity through a canula. By the same canal aspiration was made by means of a syringe; not a drop returned. The canula was replaced by a metallic tube, 4-5 mm. in diameter with lateral perforations 4-2 mm. and 6 mm. apart. Only a few grams could be drawn by aspiration. A glass tube 1 cm. in diameter with lateral perforations 4-3 mm. and 13 mm. apart was introduced by another orifice. Only a slight amount greater than before could be withdrawn. In using the two tubes spoken of Dr. Delbet attempted in two cases to withdraw injections from the abdomen, in one case of a litre and in the other of 1500 grams. After more than twenty attempts without any result the abdomens were opened. In the true pelvis of one case there was about 100 grams of fluid. In the other there was removed with a sponge more than 700 grams of fluid. In the first case the great omentum was disposed in a peculiar manner. The doctor thinks that these experiments show that we cannot rely on aspiration to procure drainage.

Capillary drainage was the idea of Hegar and was described by Kaltenback in 1881. Hegar used an enormous tube (Bauch's speculum) 3 cm. x 3 cm. in diameter and 18 cm. long, by which he could look into the abdomen. He filled it with iodoform gauze. Subsequently he abandoned the use of the speculum and used only the gauze. Kehrer employs a smaller tube of rubber or metal and replaces the gauze by wicks of cotton. To facilitate the changing of the wicks he proposes the use of a double canula similar to that used in tracheotomy. The relative value of gauze and wicking have been discussed. Gersuny objects to the gauze because particles may drop off, or its meshes may become penetrated by tissue. Chrobak has sought to demonstrate experimentally the value of the wicking, but the gauze is used by the majority of gynecologists and has given satisfaction. In 1886, Mikulicz proposed the following method of drainage: "I take a piece of iodoform gauze (20%) the size of a large handkerchief, to the middle of which is stitched a strong piece of aseptic silk thread. They

are placed before the operation in 5% phenol solution. When used the gauze is arranged in the form of a pouch so that the silk thread is within and its free extremity issues from the neck of the pouch and its other extremity is fastened to the bottom. The bag is thrust by means of curved forceps to the bottom of the pelvis and is filled with strips of iodoform gauze in such a way that its walls are everywhere in contact with the wound. The thread fixed to the bottom of the bag is drawn on when it is desired to withdraw the drain.

Mikulicz advises using this method in cases where there is a large space of moribund (?) tissue where it is impossible to suture the sides together. The principal is that adhesions are formed about the gauze and the objectionable area is cut off from the peritoneal cavity. The following advantages are claimed by Mikulicz: The sac of gauze acts as a tampon. It drains the pelvic wound in a simple and perfect manner by utilizing capillary attraction. It maintains the cavity aseptic and shuts off infection from the peritoneal cavity.

To day many surgeons adopt a method which is neither that of Kehrer nor that of Mikulicz. They place strips of gauze so that one extremity rests on the point to be drained and shut off, and the other rests in the lower angle of the abdominal wound. Hegar formerly placed the iodoform gauze in the tube. Pozzi placed the tube in the center of a mass of gauze. Hegar renounced the tube as more injurious than useful. Others, however, continue its use. It is claimed that the gauze introduced directly into the cavity is pierced by tissue which insinuates itself into its meshes, and it does not prevent the orifice through which it passes from retracting. For these two reasons it is sometimes difficult to withdraw it and there may be a slight hæmorrhage in so doing. Delbet does not attach much importance to these arguments. The opposite method of putting the tube in the gauze is thought by M. Pozzi and also M. Routier to have advantages. Sometimes when the gauze is removed there is seen to immediately follow it a considerable quantity of fluid. This happened in a case of Kuster, but Mikulicz imputed it to faulty *technique*, claiming that the gauze had not come in contact with all parts of the wound and the fluid came from a diverticulum. Moreover the too narrow

orifice had in some way compressed the gauze and prevented the filtration of liquid.

The author thinks that Mikulicz may be correct and urges that care be taken to follow his warning, *i. e.*, that the gauze should come in contact with all the wounded surface and that the exit of the gauze should be large enough for it to perform its function. As to the importance of using a tube in the gauze, we regard this as prudent. In case one wishes to use the gauze to check hæmorrhage the tube is an objection. The author concludes this portion of his paper with the following conclusions :

1. That the only method of drainage which permits evacuation of fluids during the first hours after operation is capillary drainage.
2. That all the drains are rapidly surrounded by adhesions which render extraperitoneal the tissue about them. This is perhaps the reason for their efficacy.

We defer criticism in regard to Dr. Delbet's work until we have the second portion of his paper before us, and while the experiments are open to some question yet they are instructive and exceedingly interesting.

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BARLING ON CARCINOMA OF THE BLADDER.

In the *Birmingham Medical Review* of March, 1890, Mr. Gilbert Barling presents a study of carcinoma of the bladder based on 74 cases and specimens. He accepts two classes of carcinomas, the squamous-celled, or epithelioma, and the alveolar, the former out-numbering the latter by nearly two to one, the actual numbers being 47 and 27. The epitheliomas are made up of epithelium, the general tendency of which is towards the squamous condition, with marked productions of the cell nests of epidermic globules so characteristic of its growth when it exists in other parts of the body, whilst there is hardly any attempt at the formation of fibrous tissue alveoli. Such growths are doubtless derived from the superficial layers of epithelium, which approximates to the squamous kind.

The alveolar carcinomas differ histologically from the former by their